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**(54) Parking meter**

(57) Parking meters 1 are connected with a public telephone network 4 and the settlement of the parking fees due occurs via, or with the aid of, this public telephone network. Payment can occur by making use, for the purpose of parking, of a preferably contactless chip card 3 with credit function, which indicates from what telephone account the amount due can be booked off. Payment can also occur by making use of a debit card, which may or may not be upgradable, or an electronic purse which a particular value has previously been paid into. By coupling a sensor 6 or 8 to the parking meter, by which the presence of a car can be established, it is possible to automate the control function.

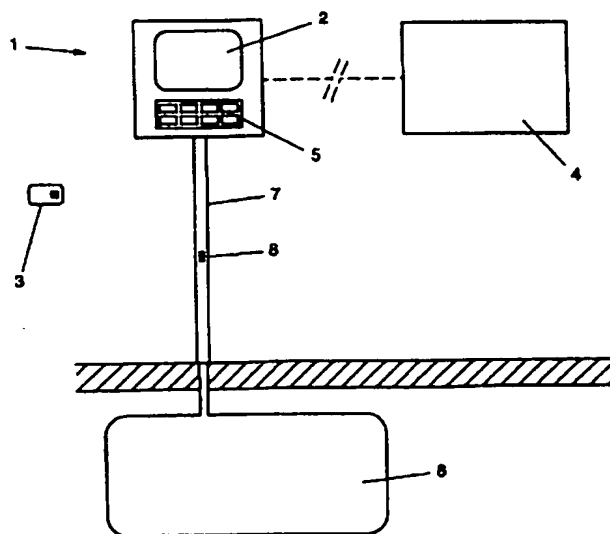


Fig. 1

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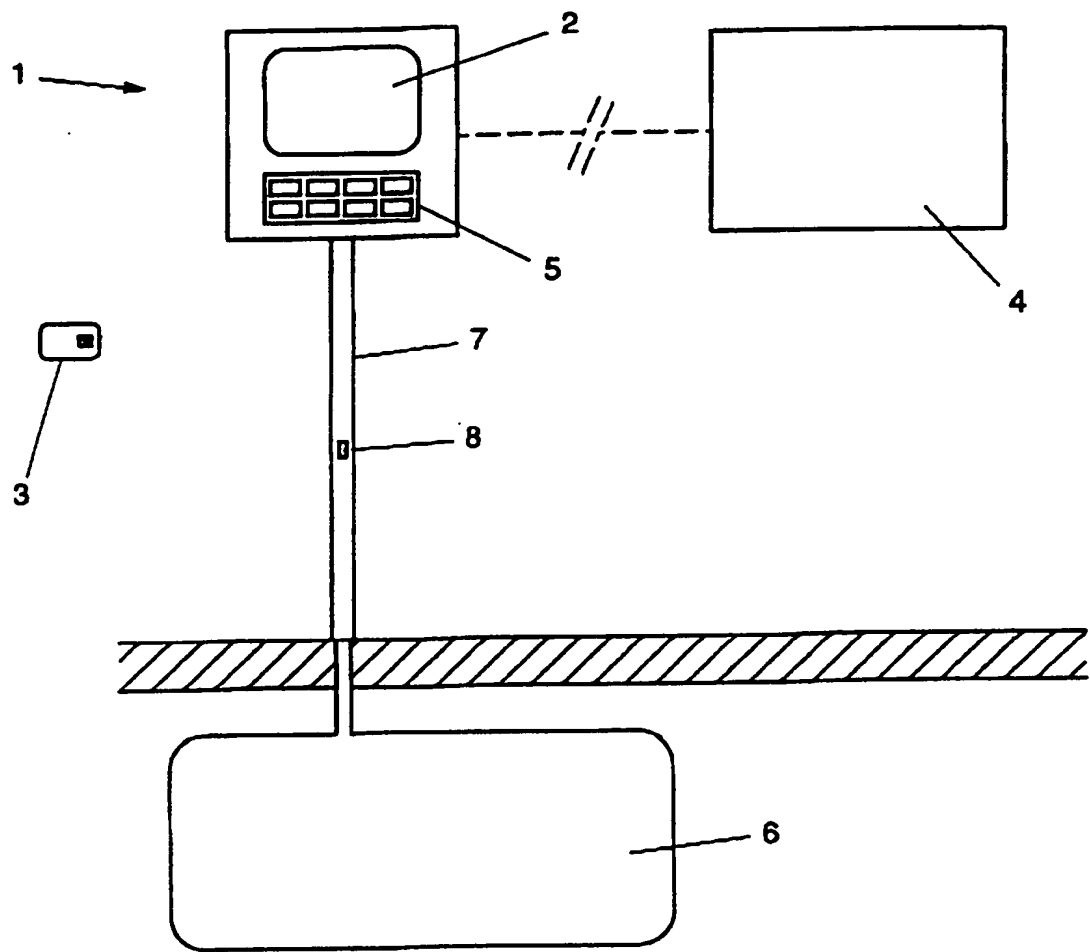


Fig. 1

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Title: Parking meter with control system

This invention relates to a system for the purpose of parking in, for instance, town centres. With a system according to the present invention, it is also possible to detect, and optionally impose a fine for, parking violations  
5 by automatic route.

With the current parking meters, either coins are inserted into a parking meter or coins are inserted into a centrally arranged paying unit, whereafter parking is allowed for a particular time. The allowable parking time depends on the  
10 rates and the amount of money which has been paid in coins.

The disadvantage of these known parking systems is that they invite vandalism, because money is present in the parking meters.

Accordingly, there is a need for a reliable and "coinless"  
15 parking system. To that end, according to the invention, a parking system of the above-described type is characterized in that the parking meters in operation are coupled to the public telephone network and further comprise means for cooperation with a chip card for the payment of parking fees due.

20 In a parking system according to the invention, no use is made of coins, but payment occurs through a preferably contactless chip card. An advantage of contactless chip cards in this context is that no moving parts are necessary in the parking meters and that the parking meters need not have any  
25 slots in which, for instance, chewing gum might be stuffed or which can be simply rendered inoperative in a different manner.

A contactless card also has advantages in that it is in line with the currently observable trend in public transport whereby transport companies embark on contactless chip cards because with the aid of these cards the transactions can be  
5 completed faster than with chip cards provided with contacts (contact chip cards).

A hybrid solution as proposed in applicant's Dutch patent application no. 9101608 is also a possibility, whereby the contactless functionality can be combined with contact chip  
10 card technology. In this manner, for instance, the parking meters can be operated in non-contact manner and the user can, for instance, make a phone call in a public telephone booth by means of the same card, but using the contacts thereof.

Hereinafter the invention will be described in more  
15 detail, with reference to the accompanying drawing.

The drawing shows a parking meter 1 according to the invention, which comprises means 2 for cooperating with a chip card 3 and is linked to the public telephone network 4. This link does not mean that each parking meter requires its own  
20 connection. It is also possible, for instance, to provide a number of parking meters jointly with one telephone connection because these meters will not all be operated at the same time.

Payment of the parking fee can proceed at a parking meter  
25 according to the invention in one of the following ways.

In a first method, by holding the contactless chip card 3 adjacent the antenna 2 of the parking meter, it is communicated to the meter to what telephone subscriber the

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parking fee due can be charged. Here, by means of suitable  
selling means 5, such as, for instance, touch keys, optical  
keys (i.e. keys containing an interruptible light barrier),  
common push buttons, a rotary knob, and the like, a choice can  
5 be made from a number of different parking times.

At the instant when the parking meter detects a valid  
(contactless) chip card 3, a telephone line is selected and  
depending on the choice made with respect to the parking  
period, a number of units (ticks) corresponding with the  
10 parking time are charged via the telephone exchange to the  
telephone account of the person parking. This procedure works  
in a manner approximately comparable with a 06/information pay  
number. The (contactless) chip card here contains the  
telephone number which the costs can be charged to. Of course,  
15 sufficient protection must be provided for, for instance  
through inclusion of a suitable authentication procedure, such  
as the procedure according to the Data Encryption Standard  
(DES), to verify the authenticity and optionally the validity  
of the card and, conversely, the authenticity of the parking  
20 meter as well.

This first method is a co-called credit method, whereby,  
as in the case of the telephone, payment is not effected until  
after the service has been rendered.

A second method is the so-called debit method, whereby  
25 money has previously been paid into a card, into an electronic  
purse, as it were.

In this method, either use can be made of single-use  
cards, such as the telephone chip cards currently in use, or

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use can be made of upgradable cards which can be recharged with a certain amount of money.

In the second method, the parking meter according to the invention need not immediately enter into contact with the telephone exchange but can reduce the residual value of the card on the basis of the parking rates, at least if the value of the card permits this transaction.

The "downgrading" of the card, and optionally also the upgrading of the card, can also be effected from the telephone exchange. Further, the telephone network can serve to assign parking fees which have been booked off from a card to the correct entitled entity.

Of course, it is also possible to provide the parking meter with a slot with a contact interface. In connection with resistance to vandalism, however, a contactless card provides advantages.

Through a combination of functionality as proposed in applicant's Dutch patent application no. 9101608, in this manner a link can be established between telephony, travelling and parking.

If the electronics in the parking meter are so designed as to entail a very low energy consumption, these electronics can be supplied from the telephone network, which eliminates the necessity of a separate mains voltage connection.

By coupling a sensor to the electronic parking meter according to the invention, which sensor determines whether or not a car is parked at this meter, it is possible to establish whether the parking time is being exceeded. To this end,

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optionally separate time control means may be provided. The violation of exceeding the parking time can be subject to an additional, for instance progressive, charge, depending on the duration of the excess in the case of the first method of payment. In the second method of payment, it is possible for the parking person to pay the surcharge due when he is leaving, by means of the chip card. If he fails to do so, which can be automatically determined with suitable control means, the prosecution of this violation can be followed up in the form of a higher penal rate.

By means of the above-described sensor, it is also possible to prevent an additional payment being made without the parked car having been removed from the parking place.

The sensor, for the purpose of establishing whether a car is parked at the meter, can for instance consist of a detection loop in the road surface, which may for instance be part of a tuned circuit which is detuned by the presence of a car. It would also be possible, for instance, to mount an optical, acoustic or electromagnetic sensor in the post to which the parking meter is secured.

Mounting the sensor in the post is preferred, because this facilitates the installation of the parking meter. In that case, however, higher frequencies will be necessary if an electromagnetic sensor is opted for.

It is observed that after the foregoing, various modifications will readily occur to those skilled in the art. As already indicated, the cards suitable for the parking system described can be of the type with contacts as well as



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of the contactless type. Also applicable, of course, are cards which are equipped with contacts and at the same time permit of contactless use. Such cards can, if desired, be constructed in the manner described in Dutch patent application 9101608, 5 so that communication with the parking meter over relatively great distances is also possible. Also, the parking meters of the system may be provided with an insertion slot or a panel provided with an antenna loop, as indicated at 2, or with both possibilities. It is also possible to provide a parking meter 10 with more than one sensor or with more than one type of sensor. Thus, it would be possible to employ both a detection loop in the ground and a sensor mounted on the post. Such modifications are understood to fall within the scope of the invention.

## CLAIMS

1. A parking system comprising a number of parking meters arranged at parking places, characterized in that the parking meters in operation are coupled to the public telephone network and further comprise means for cooperation with a chip  
5 card for the payment of parking fees due.

2. A parking system according to claim 1, characterized in that use is made of a chip card, which may or may not be contactless, with credit function, by which it is indicated from what telephone account the parking fees may be booked  
10 off.

3. A parking system according to claim 2, characterized in that a card authentication procedure, for instance using a DES algorithm, is used to establish the authenticity of a card and/or the authenticity of a parking meter.

15 4. A parking system according to one or more of the preceding claims, characterized in that use is made of a chip card, which may or may not be contactless, and may or may not be upgradable, with a debit function, a particular value having previously been programmed into the card, which value  
20 is downgraded when a parking meter is used.

5. A parking system according to one or more of the preceding claims, characterized in that use is made of a card with both contacts and a contactless function, the electronic payment function being possible via both interfaces, that is,  
25 both via the contacts and via the contactless route.

6. A parking system according to one or more of the preceding claims, characterized in that a number of parking meters are provided with a control system comprising a sensor for determining whether a car is parked at the parking meter.

5 7. A parking system according to claim 6, characterized by time control means, which can determine whether the parking time has elapsed.

8. A parking system according to claim 7, characterized in that in a credit system, an additional fee owing to the  
10 parking time being exceeded is automatically charged to the identified telephone account.

9. A parking system according to claim 7, characterized in that in a debit system, an additional fee owing to the parking time being exceeded can be settled by booking this amount off  
15 a chip card when leaving the parking place.

10. A parking system according to claim 9, characterized by control means which detect whether the additional fee has been paid upon leaving the parking place

11. A parking system according to one or more of claims 6-10,  
20 characterized in that the sensor comprises at least one detection loop in the surface of the parking place, which loop forms part of an electronic detection system.

12. A parking system according to claim 11, characterized in that the electronic detection system comprises a tuned  
25 resonance circuit which is detuned by the presence of a car in the parking place.

13. A parking system according to one or more of claims 6-10, characterized in that the sensor comprises at least one

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optical, acoustic or electromagnetic sensor, which is mounted in the post of a parking meter.

14. A parking meter comprising means for cooperation with an electronic chip card suitable for use in a parking system
- 5 according to any one of the preceding claims.



The  
Patent  
Office

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Application No: GB 9603082.0  
Claims searched: All

Examiner: Mr. G. Nicholls  
Date of search: 8 March 1996

Patents Act 1977  
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4T (TAF) G4V (VAK VAL)

Int Cl (Ed.6): G07C 1/30 G07F 7/08 7/10 17/24

Other: ONLINE : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	WO 84/01073 A1 (KATZEFF) Whole document	1, 2, 4, 14

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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